What is claimed as new and desired to be protected by Letters Patent of the United States is:

1. A method of forming a copper damascene structure, said method comprising the steps of:

forming a first opening through a first insulating layer;

forming a second opening through a second insulating layer which is provided over said first insulating layer, said first opening being in communication with said second opening;

forming a titanium-silicon-nitride layer in contact with said first and second openings; and

providing a copper layer in said first and second openings.

2. The method of claim 1, wherein said first insulating layer includes oxide material.

3. The method of claim 1, wherein said first insulating layer includes a material selected from the group consisting of polyimide, spin-on-polymers, flare, polyarylethers, parylene, polytetrafluoroethylene, benzocyclobutene, SILK, fluorinated silicon oxide, hydrogen silsesquioxane and NANOGLASS.

4. The method of claim 1, wherein said first insulating layer is formed by deposition to a thickness of about 2,000 to 15,000 Angstroms.

5. The method of claim 4, wherein said first insulating layer is formed by deposition to a thickness of about 6,000 to 10,000 Angstroms.

6. The method of claim 1, wherein said second insulating layer includes oxide material.

7. The method of claim 1, wherein said second insulating layer includes a material selected from the group consisting of polyimide, spin-on-polymers, flare, polyarylethers, parylene, polytetrafluoroethylene, benzocyclobutene, SILK, fluorinated silicon oxide, hydrogen silsesquioxane and NANOGLASS.

8. The method of claim 1, wherein said second insulating layer is formed by deposition to a thickness of about 2,000 to 15,000 Angstroms.

9. The method of claim 8, wherein said second insulating layer is formed by deposition to a thickness of about 6,000 to 10,000 Angstroms.

10. The method of claim 1, wherein said first and second insulating layers are formed of same material.

11. The method of claim 1, wherein said titanium-silicon-nitride layer is formed by metal-organic atomic-layer deposition.

12. The method of claim 11, wherein said titanium-silicon-nitride layer is deposited at a temperature of about 180°C.

13. The method of claim 1, wherein said copper layer is selectively deposited by chemical vapor deposition.

14. The method of claim 13, wherein said copper layer is selectively deposited at a temperature of about 300°C to about 400°C.

15. The method of claim 14, wherein said copper layer is selectively deposited in an atmosphere of pure hydrogen from the β-diketonate precursor bis(6,6,7,8,8,8-heptafluoro-2,2-dimetyl 1-3,5-octanedino) copper (II).

16. The method of claim 14, wherein said copper layer is selectively deposited in an atmosphere of pure argon from the β-diketonate precursor bis(6,6,7,8,8,8-heptafluoro-2,2-dimetyl 1-3,5-octanedino) copper (II).

17. The method of claim 1 further comprising the act of chemical mechanical polishing said titanium-silicon-nitride layer.

18. The method of claim 1 further comprising the act of chemical mechanical polishing said copper layer.

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19. A dual damascene structure comprising:

a substrate;

a metal layer provided within said substrate;

a first insulating layer located over said substrate;

a via situated within said first insulating layer and extending to at least a portion of said metal layer, said via being lined with a titanium-silicon-nitride layer and filled with a copper material;

a second insulating layer located over said first insulating layer;

a trench situated within said second insulating layer and extending to said via, said trench being lined with said titanium-silicon-nitride layer and filled with said copper material.

20. The dual damascene structure of claim 19, wherein said first insulating layer includes a material selected from the group consisting of polyimide, spin-on-polymers, flare, polyarylethers, parylene, polytetrafluoroethylene, benzocyclobutene, SILK, fluorinated silicon oxide, hydrogen silsesquioxane and NANOGLASS.

21. The dual damascene structure of claim 19, wherein said first insulating layer includes silicon dioxide.

22. The dual damascene structure of claim 19, wherein said first insulating layer has a thickness of about 2,000 to 15,000 Angstroms.

23. The dual damascene structure of claim 19, wherein said second insulating layer includes a material selected from the group consisting of polyimide, spin-on-polymers, flare, polyarylethers, parylene, polytetrafluoroethylene, benzocyclobutene, SILK, fluorinated silicon oxide, hydrogen silsesquioxane and NANOGLASS.

24. The dual damascene structure of claim 19, wherein said second insulating layer includes silicon dioxide.

25. The dual damascene structure of claim 19, wherein said second insulating layer has a thickness of about 2,000 to 15,000 Angstroms.

26. The dual damascene structure of claim 19, wherein said titanium-silicon-nitride layer has a thickness of about 50 Angstroms to about 200 Angstroms.

27. The dual damascene structure of claim 26, wherein said titanium-silicon-nitride layer has a thickness of about 100 Angstroms.

28. The dual damascene structure of claim 19, wherein said copper material includes copper or a copper alloy.

29. The dual damascene structure of claim 19, wherein said substrate is a semiconductor substrate.

30. The dual damascene structure of claim 29, wherein said substrate is a silicon substrate.

31. A damascene structure comprising:

a substrate;

a metal layer provided within said substrate;

at least one insulating layer located over said substrate; and

at least one opening situated within said at least one insulating layer and extending to at least a portion of said metal layer, said opening being lined with a titanium-silicon-nitride layer and filled with a copper material;

32. The damascene structure of claim 31, wherein said at least one insulating layer includes a material selected from the group consisting of polyimide, spin-on-polymers, flare, polyarylethers, parylene, polytetrafluoroethylene, benzocyclobutene, SILK, fluorinated silicon oxide, hydrogen silsesquioxane and NANOGLASS.

33. The damascene structure of claim 31, wherein said at lest one insulating layer includes silicon dioxide.

34. The damascene structure of claim 31, wherein said at least one insulating layer has a thickness of about 2,000 to 15,000 Angstroms.

35. The damascene structure of claim 31, wherein said titanium-silicon-nitride layer has a thickness of about 50 Angstroms to about 200 Angstroms.

36. The damascene structure of claim 35, wherein said titanium-silicon-nitride layer has a thickness of about 100 Angstroms.

37. The damascene structure of claim 31, wherein said copper material includes copper or a copper alloy.

38. The damascene structure of claim 31, wherein said substrate is a semiconductor substrate.

39. The damascene structure of claim 38, wherein said substrate is a silicon substrate.

40. A processor-based system comprising:

a processor; and

an integrated circuit coupled to said processor, at least one of said processor and integrated circuit including a damascene structure, said damascene structure comprising a metal layer over a substrate, at least one insulating layer located over said metal layer, and at least one opening situated within said at least one insulating layer and extending to at least a portion of said metal layer, said opening being lined with a titanium-silicon-nitride layer and filled with copper.

41. The processor-based system of claim 40, wherein said processor and said integrated circuit are integrated on same chip.